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ARCHEOLOGY AND ETHNOLOGY.[1]

Gailenreuth Cave in 1894.—Dr. Zittel says (Beiträge zur Anthropologie und Urgeschichte Baierns ii, p. 226) that the remarkable discoveries in the English and French caves about 1875, caused the comparatively recent exploration, notably by Dr. Fraas (about 1877), of caverns in the limestone valleys of the upper tributaries of the Main (in the Franconian Switzerland, Bavaria) and along the northern confluents of the Danube (in Würtemberg). But, as he explains, J. F. Esper (Ausführliche Nachricht von neuentdeckten Zoolithen, 1774), had scientifically examined several of the Wiesent Valley caves (in Franconia) more than a hundred years before, and, as far as is known, had anticipated all investigators—even the Rev. McEnery, the long-neglected explorer of Kent's Hole—in the discovery of human remains associated with the bones of extinct Plistocene mammals.

The cave map of Bavaria (Beiträge zur Urgesch. Bai. 2, plate 14) is thickly dotted with the red signs for caverns in the mill region north of the right Danube bank between Ulm and Ratisbon, here and there in the Alpine valleys of the Iller, Isar and Saal far to the southward, but thickest of all along the upper Main Valley by the Wiesent, Ailsbach and Püttbach tributaries, about a spot twenty miles to the southwest of Bayreuth. Here it was, in the hill-top cave, one-quarter of a mile from the Castle Gailenreuth (left bank of Wiesent, two miles above Muggendorf), that Esper's most important work was done. The entombed bones of legendary Dragons and Unicorns, the extraordinary teeth exhumed during the Middle Ages to be ground into medical nostrums, had not yet been rearranged into the now well-known shapes of Mammoth, Cave Bear, Hyena and Rhinoceros. Human prehistoric work in stone was unrecognized, and the existence of River Drift and Cave Men was unsuspected, when at Gailenreuth, on finding a human jaw with three teeth and a shoulder-blade in a layer of "Antediluvian" bones, Esper made the memorable observation:

"Since they (the human remains) lay under the animal bones with which the Gailenreuth Cave was filled; since they were found in what, in all probability, was their original layer, I infer, not without adequate ground, that these human relics were of like age with the animal remains above them."

This remarkable inference, in 1774, making Gailenreuth classic ground for the cave explorer, was carried no farther by Esper. Nor did it impress Buckland who, though he visited the cave in 1816, and carried a skull afterwards found (now in the Oxford Museum) to England, seems to have regarded with indifference the similar observations of McEnery at Kent's Hole. No further cave exploration was undertaken in the Franconian region until 1878.

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[1] This department is edited by H. C. Mercer, University of Pennsylvania.

The Gailenreuth Cave or "Zoolithenhöhle" enters the top of a gentle hill separated from the brink of the widest gorge (about 290 feet deep) by a level plateau. Cold and wet as I found it, in August, 1894, and accessible from the stream only after a steep climb, with an entrance (now walled up) invisible from the valley, and not at all conspicuous from the plateau above, the remote forest-hidden cavern, like Hartman's Cave in Pennsylvania, had the look rather of an animal den than a possible habitation for primitive savages.

Esper found its two spacious chambers as now level-floored with the entrance and ending in two or more chasms 20 feet deep by 6 to 10 feet in diameter in the rear. His description makes it uncertain whether he dug his trenches at the bottom of the chasms or on the chamber floors, how deep he went, and whether he reached rock bottom. In his search for bones the following points were noted:

(1) *The pottery.*—The whole cave floor (chambers and chasms) was covered with a bed of charcoal, above which rested a layer of potsherds. These he divided into four kinds: (a) rude hand made of red brick clay mixed with coarse sand; (b) of rude, sandy clay, with fragments of quartz; (c) of finely worked potters' clay, smoked dark and glazed outside and in; and (d) of carefully worked, fine red potters' clay.

Repeating the notion of cremation of bodies, he supposed that the potsherds were the remains of the urns in which food had been placed near sacred fires built by Huns or Wends to the spirits of their kinsfolk 800 to 1000 years before.

This pottery is still abundant. I scratched out several pieces in the disturbed earth at the bottom of one of the chasms. Esper says that it does not occur at a greater depth than three feet.

(2) *The immense number of animal bones*—The fauna afterward identified, given by Ranke, consisted of Mammoth, Giant Elk, Reindeer, Cave Bear (dominant), Gray Bear, Brown Bear, Cave Lion, Cave Hyena, Woolly Rhinoceros,[2] Wolf, Fox, Beaver, Glutton, Cave Rat and Ground Squirrel. The bones lay in confusion at the bottom of the chasms and in a thick bed under the potsherds on the chamber

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[2] Ranke (Beiträge 2, p. 196), quoting Dawkins, does not mention Woolly Rhinoceros, Glutton (*Gulo spelaea*), Beaver, *Arvicola spelaea*, and Squirrel, but I found them labelled from Gailenreuth in the Schloss Museum at Bayreuth.

floors, and how they got there has remained a puzzle to the present day. I found the gnawed fore-leg bone of *Ursus spelaeus* at the bottom of one of the chasms, but the Carnivora or men could not have brought in the fossils, since none, it seems, have been mentioned as split for the marrow and very few gnawed.

If water washed them in (and this has seemed likely from the pebbles found mixed with them), then we must imagine a valley nearly the size of the Niagara Gorge, as yet uneroded, with the Wiesent somehow sweeping into the cave the bones and not the carcasses of animals that had perished along its shores.

Animals often go into caves to die, but Esper urges they could not have done so in this case, as he found no skeletons entire. He suggests an immense flood driving them to the cave for refuge, where, being drowned, their remains were washed about and broken by surging waters. But, after fairly stating the objections to this and other theories, he gives up the problem in despair.

Esper based his notion of the immense number of animals represented, not on the fragments found, but upon a white, chalky layer of decomposed bones, which he does not describe as continuous, discovered by him in several parts of the cavern. If we give this up as a test of quantity, we have only left for a witness of the often alleged prodigious number of individuals in Gailenreuth, the thickly scattered fragments from 3 to 6 inches long, and in the proportion of about 15 to a half bushel of earth, which I saw on scratching with a hoe, at the bottom of the chasms.

Spite of all the bone hunting done in the cave, there are probably as many of these pieces (which no collector would want) as ever. And if it is fair to guess at the ratio of bones to earth from them, and from the odds and ends set in the growing stalagmite of the walls, the number of entombed animals, though great, was not extravagantly so.

(3) *The human bones.*—The jaw and shoulder blade Esper found at a depth, not exactly stated, of several feet under an extending ledge of rock at a point not since identified. They were bedded in a layer one foot thick of fossils mixed with pebbles, which underlaid the white chalky stratum of decomposed bones above-noted, and have been, unfortunately, lost. I found no description of the position of the skull mentioned by Ranke as afterwards found in the cave, and taken to England by Buckland.

Potsherds, according to Esper, were found at depths of three feet, and without more conclusive evidence, it must remain doubtful whether in this case the human bones were not intrusive and to be referred to a later time than that of the fossil animals.

In the bottom of one of the chasms, which had evidently been disturbed by previous digging to a considerable depth, my scratching brought to light two teeth, a lower jaw and leg bone of *Ursus spelaeus.* The wet stalagmitic walls of the rift were scantily bedded with bone fragments, and I saw many pieces set in loose fragments of breccia which recent fossil hunters had gouged out of the walls and found not worth taking away. No doubt crusts of stalagmite projecting here and there from the walls over the cave earth had been broken through, but I saw no signs of previously-existing floors of large extent in the chasm.

Here, where some loose bones steeped in carbonate of lime were hard as stone, while others projected from the drip looked comparatively fresh,[3] the value of breccia, of fossilization, and of stalagmitic crusts covering underplaced layers as tests of age seemed small. Still more was I inclined to reject such criteria when, a few days later, I was shown stalactites 60 centimeters long produced in fifteen years on the reservoir roof at Bayreuth, and when Professor Adami, of Bayreuth, told me that he had seen, in 1884, stalactites in a tunnel between Zelfenkasten and Conters (in Switzerland) 6 inches long and forty years old. It was soon apparent that a great deal of digging had been done in the cave. No doubt the searchers for " Unicorns horns " had been there before Esper. Doubtless " Neuhaus Hans " of recent local fame had found profit in the contents of down-reaching fissures. But, in spite of the frequent overturning of mould and breccia, it might not be impossible still to demonstrate the meaning of the layers at Gailenreuth. The bottoms of the chasms have probably, owing to the cramped space, never been reached, and several places may well exist in the upper chamber floors that have not been disturbed at all. However that may be, Gailenreuth, the starting point of modern cave exploration, shows well the bearings and the difficulties of real work done in caverns, and suggests many of the puzzles which still perplex the investigator.

H. C. MERCER.

[3] Like the Cave Bear and Lion skulls in the Schloss Museum at Bayreuth.